Process Functional Safety

Global Safety engineering and consultancy services to various industries including O&G, PetroChemical, Fine Chemical and Life Science

Capabilities

• Functional Safety Management Systems
• Process Hazardous Analysis methods such as Hazard and Operability (HAZOP)
• Safety Integrity Level (SIL) Targeting
• Safety Device Sizing
• Hazardous Area Classification
• ATEX Compliance
• SIL Assessment
• Product Certification
• Quantified Risk Assessment (QRA)
• Dispersion Modeling / Consequence Analysis
• General Reliability / Availability Studies
• Functional Safety Training

For more information contact your local Rockwell Automation sales office or email us at: ProcessSafety@ra.rockwell.com

Learn more online at: http://www.rockwellautomation.com/industries/oilgas/

Rockwell Automation Functional Safety Services

Applying the generic standard IEC61508, or the process sector implementation IEC61511 and others, is fundamental to addressing the legal obligations to protect people and the environment.

Rockwell Automation has a global safety team of consultants who are experienced and competent in the application of the standards. We can provide assistance to end users, integrators, OEMs throughout the whole project lifecycle from front end engineering through design, build, commissioning and training.

Combined with our knowledge in process engineering and automation, we can provide comprehensive process safety consulting services which has been part of our core competency for over 20 years.
**Functional Safety Management**

We have experience in developing Functional Safety Management (FSM) Systems for major operators worldwide, as well as supporting clients with Functional Safety Assessments (FSA) and Audits against the requirements of IEC61508 and IEC61511.

**Process Hazard Analysis (PHA)**

We can provide experienced facilitators and scribes to conduct Process Hazard Analysis, or other PHA methods, including Hazard and Operability (HAZOP), Hazard Identification (HAZID) and What-If studies worldwide.

We can achieve a process which is clear, fully recorded and traceable, while directing the discussion and allowing adequate time for effective hazard identification and evaluation. The scribe provides the secretarial support so that the PHA is fully recorded and traceable.

**SIL Determination**

We can facilitate and scribe SIL Determination studies to identify Safety Integrity Level (SIL) targets either semi-quantitatively using Risk Graph or quantitatively using Layer of Protection Analysis (LOPA) or Fault Tree Analysis (FTA) techniques. We have access to a large database of reliability data traceable to published sources, which can be used in the analysis.

Once SIL targets are set, we can specify and generate instrumentation specifications for the process to meet the SIL requirements. We can also help produce the Safety Requirement Specification.

**SIL Verification**

We have a broad experience of conducting comprehensive SIL Verification studies to determine if a particular SIF design is able to meet its respective SIL Target in accordance with IEC61508 and IEC61511.

Fault Tree Analysis (FTA) or Reliability Block Diagram (RBD) techniques, quantified with traceable data, are used to determine the Probability of Failure on Demand (PFD) or Probability of Failure per Hour (PFH), Availability, Spurious Trip Rate (STR), Hardware Fault Tolerance (HFT) using Safe Failure Fraction (SFF), and Systematic Capability as required.

**Product Certification / Compliance**

We have wide ranging experience of conducting Failure Modes, Effects and Criticality Analysis (FMECA) for various applications including quantifying plant availability, identifying single point failures and product certification / compliance.

We have certified a number of sensors and logic solvers from suppliers in the UK, Europe and the USA up to and including SIL3. Additionally, we can carry out safety compliance studies, e.g. ATEX studies and compliance of process plant to CE regulations for ATEX.

**Safety Device Sizing**

We have the capability to complete rating/sizing exercises using the AspenPlus™ process simulator, which executes rigorous dynamic mass and energy balances around a pressure relief system, including the relief device(s), inlet and outlet lines and equipment nozzles. This can be done for new applications or to check existing devices against new process conditions or new regulations.
Hazardous Area Classification (HAC)

Our Electrical and Process Engineering teams collaborate to carry out HAC as an integral part of the project/process risk assessment to identify areas where controls over ignition sources are needed (hazardous places) and also those places where they are not (non-hazardous places).

Hazardous area classification is used to identify areas in the process/facility where, because of the potential for an explosive atmosphere, special precautions over sources of ignition are needed to prevent fires and explosions. Hazardous places are further classified in Zones/Divisions which distinguish between places that have a high chance of an explosive atmosphere occurring and those places where an explosive atmosphere may only occur occasionally or in abnormal circumstances.

Our engineering team is competent with CENELEC / IEC, NEC and ATEX Classifications.

Quantified Risk Assessment

We have experience in conducting Quantified Risk Assessment (QRA) studies for some of the largest onshore, offshore and subsea oil and gas fields in the world. We can use the QRA approach as a means to evaluate the cost benefit options of alternative protective solutions, providing comparative analysis of the risk reduction offered, production downtime and the lifecycle costs of implementation.

This typically uses techniques such as LOPA and FTA for hazard frequency analysis, Event Tree Analysis (ETA) for scenario development and Dispersion Modelling to evaluate the nature of any harmful releases.
Dispersion Modelling / Consequence Analysis

Consequence Analysis allows risks to be quantitatively assessed against established risk criteria and graphically represented using F-N Curves. This methodology, in conjunction with a Cost Benefit Analysis (CBA) can be used to demonstrate that risks are As Low As Reasonably Practicable (ALARP).

Our consultants use software tools to evaluate the dispersion of a liquid, gaseous and two-phase release from a pipeline or vessel. Dispersion modelling allows the progress of flammable and toxic materials (from the initial loss of containment event to far-field consequences) to be examined, and the probability of fatality to be calculated. Dispersion profiles are plotted on maps showing concentration and lethality contours across the site.

Training

We offer introductory 1 day awareness course and in-depth bespoke courses in IEC61508 and IEC61511 which can be tailored to your process, industry or lifecycle phase. Every course is delivered with worked examples and workshops to provide practical experience.

Rockwell Automation is an approved course provider of the TUV Rheinland Functional Safety Program (Safety Instrumented Systems). Any engineer with 3-5 years’ experience in Process Functional Safety is eligible to attend the course.

www.rockwellautomation.com